DISABILITY DISCRIMINATION USING ARTIFICIAL INTELLIGENCE SYSTEMS AND SOCIAL SCORING: CAN WE DISABLE DIGITAL BIAS?

Nizan Geslevich Packin*

Abstract: Algorithmic assessments of personal characteristics gleaned from social networks are regularly used to rate people in fields ranging from insurance premiums, to hiring decisions and employment chances, to social security benefits. These algorithms comb through huge datasets (such as information uploaded by users on social networks) to "learn" correlations and trends between certain characteristics and to generate "people-rankings", which systematically rate individuals based on social, reputational, physical, mental and even behavioural features. Because such algorithms equally apply to people with, and without, disabilities, they are particularly pernicious for people with disabilities. In other words, the algorithms rank persons with disabilities lower (or as less desirable) than able-bodied individuals, resulting in discrimination against those with disabilities by the public and private sector organisations that rely on such algorithms. Legislative action is needed to provide people with disabilities with legal protection from such algorithmic discrimination, regardless of whether such discrimination is purposeful or inadvertent. Because such algorithms are used across a wide variety of industries, legislation requiring that similarly situated disabled and able-bodied persons receive the same algorithmic ranking can dramatically help to improve the life quality and opportunities available for people with disabilities.

Keywords: *artificial intelligence; social media; algorithms; disability; discrimination; digital technology; big data; innovation*

* Nizan Geslevich Packin is Associate Professor of Law at Baruch College, City University of New York; Senior Lecturer at Haifa University Faculty of Law; Fellow at the Yale Cyber Leadership Forum and Affiliated Faculty at Indiana University Bloomington's Program on Governance of the Internet and Cybersecurity. Nizan researches Financial Regulation, Consumer Protection law, Ethical Implications of Digital Technologies, Business Law and Information Law. Before academia, she practised at Skadden, Arps, Slate, Meagher & Flom LLP; clerked in the Israeli Supreme Court and interned for Judge Weinstein at the Eastern District of New York and at the Federal Trade Commission. The author may be contacted at Law Department, Baruch College, City University of New York, One Bernard Baruch Way, New York, NY 10010, USA. nizan.packin@baruch.cuny.edu.

[(2021) 8:2 JICL 487–512]

I. Introduction

> *"Discrimination takes many forms. Racism. Sexism. Even ageism. But one type of discrimination we don't discuss as frequently is ableism, or discrimination in favor of able-bodied people."*[1]

Social media platforms and digital technological tools have transformed how people manage their day-to-day lives, socially as well as professionally. Big data algorithms help us improve our decision-making processes, and sophisticated social networks enable us to connect with other individuals and organisations, uncover information and even learn about different opportunities. However, algorithmic assessment of personal characteristics gleaned from social networks fosters wide-scale discrimination for persons with disabilities, explicitly or implicitly identifying that they are not able-bodied, and butting them at a disadvantage.

Discrimination in favour of able-bodied people, or ableism, stems from the way society structures itself to favour certain types of bodily and personal characteristics over others.[2] For instance, a society that expects persons to frequently walk long distances, and designs work and social spaces to that effect, privileges persons who can walk long distances and discriminates against persons who cannot. Discrimination against persons with disabilities thus reflects conscious and unconscious decisions by social actors.[3] A retail store might use a layout that is difficult for wheelchair users to navigate because the owner expects that most customers will be non-wheelchair users or because the owner thinks having wheelchair using customers will harm the store's brand.[4] According to the social model of disability, disability is not only inherent to the individual and determined by the impairment, but it is also a product of the social environment. Social expectations, conventions and technology determine which traits are outside the norm and which traits are disabling. Whether a technology perpetuates or mitigates disability depends on social norms, including norms embedded in law. A wheelchair might mitigate *the impairment*, but only if legal rules dictate a built environment where wheelchair users and non-wheelchair users can move in a similar fashion can *the disability* be mitigated.

---

1 Edythe Copeland, "Employers Have Resources for Adapting the Workplace" *Lansing State Journal Law Blog* (February 2020), available at https://www.lansingstatejournal.com/story/money/careers/2020/02/24/employers-resources-adapting-workplace/111340878 (visited 14 December 2020).

2 See Samuel Bagenstos, "Subordination, Stigma, and 'Disability'" (2000) 86 *Virginia Law Review* 397, 422 (discussing the social model of disability, namely that disability stems from social practices rather than biology, and how the Americans with Disabilities Act (ADA) reflects that understanding of disability).

3 *Ibid*.

4 See *Colo. Cross-Disability Coalition v Abercrombie & Fitch Co.,* 765 F.3d 1205 (2014) (reversing a lower court holding that an Abercrombie store's raised dais entrance violated the ADA because the wheelchair accessible entrance was hidden and less prominent).

Ableism and technology are deeply intertwined in any society. Specifically, the extent to which society's construction privileges certain types of bodies depends, at least in part, on both the technologies that society adopts and the means in which they are deployed. In agrarian societies, the technologies used for economic production required physical strength and mobility, reducing the ways in which persons without such traits could contribute to the economy. In today's society, technological advancements, like the computer, contribute to a specialisation of labour where many high-skilled roles do not require physical mobility or strength. But conscious and unconscious biases that impact hiring, transportation infrastructure and office space design continue to perpetuate ableism.

This general story of how the interaction between a society's technologies and conscious and unconscious biases determines the forms in which ableism manifests applies to the impact of digital technology for persons with disabilities. On the one hand, digital technologies have the capacity to create more inclusive environments in both professional and social domains, but on the other, society can deploy these technologies in a manner that reflects and perpetuates existing biases and in ways or contexts that the users could not have imagined.[5]

The threat of digital technology further entrenching ableism especially manifests with respect to algorithmic decision-making. Governments increasingly use big data algorithms to administer social security and criminal justice systems, while private sector participants use these technologies to price products like insurance and loans. Though algorithmic discrimination is a problem that might affect different persons and groups, discrimination against disabled persons poses unique challenges. Even though a large part of the population has a disability,[6] disabilities come in various shapes and forms, which make bias extremely challenging to identify, prove and design around. Thus, social conventions, and especially law, must affirmatively work to prevent algorithmic discrimination against disabled persons.

This article analyses the connection between digital technology, algorithmic decision-making and discrimination against persons with disabilities. This article is structured as follows. Section II examines the elements and the scope of impact that digital technology—and in particular social media and big data algorithms—has had on the lives of people with disabilities. Section III explores and describes the discriminatory implications of the shift towards digitally assessing ranking, and rating individuals, as those manifest in the experiences of people with disabilities,

5 See generally Helen Nissenbaum, *Privacy in Context: Technology, Policy, and the Integrity of Social Life* (Stanford, CA: Stanford University Press, 2010) (describing the importance of social contexts and context-relative informational norms when considering the right to privacy). For another interesting theory that can also be relevant in this context, see Joshua AT Fairfield and Christoph Engel, "Privacy as a Public Good" (2015) 65:3 *Duke Law Journal* 385.

6 According to the Centers for Disease Control and Prevention, about 61 million Americans live with a disability. Centers for Disease Control and Prevention, "Disability Impacts All of Us" (September 2020), available at https://www.cdc.gov/ncbddd/disabilityandhealth/infographic-disability-impacts-all.html (visited 14 December 2020).

both in the public and in the private sectors. Section IV suggests legal and technological methods to combat and minimise the discriminatory harms that result from using digital and algorithmic systems to assess people with disabilities. Finally, this article concludes by calling on lawmakers to mandate that people with disabilities have a seat at the table whenever innovative digital systems and algorithms are being designed in order to more effectively mitigate the discriminatory results of algorithmic technology architectures.

II. Digital Technology and Individuals with Disabilities—a Positive Connection?

Digital technology, and in particular social media, has transformed the means in which individuals manage their day-to-day lives, socially as well as professionally.[7] For example, society relies on algorithms that constantly grow in sophistication and size,[8] and more and more individuals, businesses, institutions and even lawmakers passively outsource decision-making processes to technology,[9] especially to big data algorithms.[10] Technology impacts, and often even automates aspects of our lives that were not traditionally subject to the control of digital technology.[11] This impact has been extremely helpful in various ways.

---

7 Erin Brendel Mathews, "Forbidden Friending: A Framework for Assessing the Reasonableness of Non-solicitation Agreements and Determining What Constitutes a Breach on Social Media" (2018) 87:3 *Fordham Law Review* 1217, 1221 (discussing the intersection between personal and professional content on social media and instances in which engagement with friends and colleagues on platforms like LinkedIn may breach non-solicitation agreements).

8 See, eg, Thomas Burri, "Free Movement of Algorithms: Artificially Intelligent Persons Conquer the European Union's Internal Market" in Woodrow Barfield and Ugo Pagallo (eds), *Research Handbook on the Law of Artificial Intelligence* (Cheltenham, UK: Edward Elgar, 2018) pp. 537, 537 ("explor[ing] the implications such AI entities have for the internal market of the European Union . . ."); Tal Zarsky, "The Trouble with Algorithmic Decisions: An Analytic Road Map to Examine Efficiency and Fairness in Automated and Opaque Decision Making" (2016) 41:1 *Science, Technology & Human Values* 118, 119.

9 This is exemplified in the rise and increase of technology systems that do not merely "augment" human intellect and lives but are also meant to "automate and outsource our humanity". Evan Selinger, "Today's Apps Are Turning Us into Sociopaths" *Wired* (February 2014), available at https://www.wired.com/2014/02/outsourcing-humanity-apps (visited 14 December 2020) (using the BroApp as an example, as it is a "clever relationship wingman" that "offers the promise of 'maximizing' romantic connection through 'seamless relationship outsourcing'" and presumably helps achieve a Pareto optimal outcome).

10 See generally Brett Frischmann and Evan Selinger, *Re-Engineering Humanity* (Cambridge UK: Cambridge University Press, 2018) (discussing the consequences of outsourcing decision-making to algorithms). Essentially, the "computer is becoming our all-purpose tool for navigating, manipulating, and understanding the world, in both its physical and its social manifestations". Nicholas Carr, *The Glass Cage: Automation and Us* (New York, NY: WW Norton & Co., Inc., 2014) p. 12.

11 See eg, Christine Rosen, "Automation for the People?" (2015) 35 *Democracy: J. Ideas*, available at https://democracyjournal.org/magazine/35/automation-for-the-people/ (visited 14 December 2020) (reviewing *The Glass Cage, id*.); Nizan Geslevich Packin, "Consumer Finance and AI: The Death of Second Opinions?" (2019) 22 *N.Y.U. Journal of Legislation & Public Policy* 102, 125 (discussing how

A. Social media platforms

Social media platforms have had an enormous impact on people's lives. Giant tech platforms, like Facebook, Twitter and even Microsoft-owned LinkedIn, enable their users to create profiles with the purpose of swapping data and sharing information with different users on the platforms, typically referred to as "friends", "contacts", "followers" or "links".[12] These platforms enable users to create "networks of individuals, events, groups and/or organizations with shared relationships, interests or activities".[13] For example, LinkedIn, the most commonly known professional networking site, allows its users to "develop business opportunities, collaborate on projects, share job opportunities, and make new connections . . . share headshots, past jobs, current employment, expertise, accomplishments, and articles that are of interest . . . [and to allow one's] 'first-degree connections' to 'endorse' certain skills [one] . . . may have . . . [and] to write recommendations . . . that appear on that connection's page for anyone who has access to that connection's page to see".[14]

It is hardly news that for individuals with disabilities, new technologies assist in improving many aspects of their personal and professional lives. Providing internet access to disabled people[15] and removing barriers that prevent them from being as connected as able-bodied Americans[16] have had a huge positive impact on their

---

people passively outsource more and more decision-making processes to technology tools and showing how individuals trust AI more than they trust human experts).

12 Shaziah Singh, "Friend Request Denied: Judicial Ethics and Social Media" (2016) 7:1 *Case Western Reserve Journal Law, Technology & The Internet* 153, 154.

13 Karen Salaz *et al*., "New Media and the Courts: The Current Status and a Look at the Future" (unpublished working paper) (on file with author) (August 2010), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1666332 & http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1666332 (visited 14 December 2020).

14 See Singh, "Friend Request Denied" (n. 12), 155–156.

15 Although when the ADA was passed there were no consumer-facing websites, the ADA has proven effective and flexible enough to recognise that individuals with disabilities have a civil right to participate in all aspects of society, and that this must include their participation in the digital world. Accordingly, mobile phone apps have faced legal challenges regarding the accessibility of their platforms. For example, a visually impaired phone user sued Domino's Pizza in 2016 claiming that its pizza-ordering app was not screen-reader accessible. *Robles v Domino's Pizza, LLC*, 913 F.3d 898, 902 (9th Cir. 2019), *cert. denied*, 140 S. Ct. (2019). Similarly, defendants in the thousands of website accessibility suits that were filed in 2017–2019 ranged from Playboy.com to SoulCycle to Honey Baked Ham to NYC art galleries. See Blake Reid, "Internet Architecture and Disability" (2020) 95:2 *Indiana Law Journal* 591; Samuel H Ruddy, Note: "Websites, Apps, Accessibility, and Extraterritoriality Under Title III of the Americans with Disabilities Act" (2019) 108 *Georgetown Law Journal Online* 80, 81–82. But while the ADA does offer legal support, there is a circuit split regarding the term "place of public accommodation", and whether Title III of the ADA should cover websites and apps, which are nonphysical places of public accommodation. *Ibid*. Specifically, the "Third, Fifth, Sixth, and Ninth Circuits hold that Title III only applies to nonphysical entities such as websites or apps when they have some nexus to a physical place of public accommodation. In contrast, the First and Seventh Circuits hold that a 'place of public accommodation' is not limited to physical locations". *Ibid*.

16 For analyses of the many barriers individuals with disabilities face on the Internet, see generally Bradley Allan Areheart and Michael Ashley Stein, "Integrating the Internet" (2015) 83:2 *George Washington Law Review* 449, 457–468; Nikki D Kessling, Comment: "Why the Target 'Nexus Test' Leaves Disabled Americans Disconnected: A Better Approach to Determine Whether Private Commercial Websites

quality of life and have received much attention from both the media and the lawmakers.[17] But there is much more to the story than that. Digital tools can actually generate real and new opportunities for individuals with disabilities to successfully participate and interconnect in the public sphere.[18] Therefore, realising the possibilities that social media platforms offer, at least some commentators believe that with the advances in the technological tools that society is using to communicate, social media platforms' algorithms will assist in enhancing two main goals. First, these social media-operated algorithms and technologies will create a more equal social and professional environment, regardless of a person's body/mind.[19] Second, these sophisticated, artificially intelligent social media algorithms will enable people with disabilities to better connect with others who have similar health and medical conditions as theirs, and leverage these connections for their benefit and for the promotion of shared goals.[20] For example, social media platforms that "connect the online voices of people with disabilities are revolutionizing how they are heard and how they assemble".[21] Recent on-site demonstrations by activist individuals with disabilities against Congress's suggested legal measures to eradicate Obamacare were dependent on social media and hashtags such as #CripTheVote and #ADAPTandresist to unify protesters to take physical action.[22] Dozens of people demonstrating, most of them in wheelchairs, were actually arrested in

---

Are 'Places of Public Accommodation'" (2008) 45:3 *Houston Law Review*. 991, 999–1004. These barriers are very real: "As of 2010, only 54% of Americans with disabilities used the Internet, compared to 81% of able-bodied Americans. A recent study by the Pew Research Center characterized the digital divide between people with disabilities and those without as 'large.' According to the study, disabled Americans are about three times as likely as those without a disability to say they never go online (23% v. 8%), and disabled adults are roughly twenty percentage points less likely to say they subscribe to home broadband and own a traditional computer, a smartphone or a tablet". Victoria Smith Ekstrand, "Democratic Governance, Self-Fulfillment and Disability: Web Accessibility Under the Americans with Disabilities Act and the First Amendment" (2017) 22:4 *Communication Law & Policy* 427, 430.

17 For example, on 1 October 2020, a "bill to amend the Americans with Disabilities Act" titled the "Online Accessibility Act" with the number H.R. 8478, was introduced in the US House of Representatives. Online Accessibility Act of 2020, H.R. 8478, 116th Cong. (2020). Although on its face the bill sounds appealing to advocates for digital inclusion, it has received criticism for disability lawyers and commentators arguing, *inter alia*, that the bill (1) only addresses a fraction of ADA's coverage of technology; (2) uses the wrong standard for compliance; (3) sets up a costly and elaborate rule-making procedure with lots of delay; (4) includes civil penalties, but the United States Department of Justice can already assess those and in much higher amounts; (5) limits the rights of disabled people to enforce the ADA through private lawsuits; (6) takes away rights to enforce other civil rights laws. See eg, Lainey Feinglod, "Proposed Online Accessibility Act in US Congress is Bad for Digital Inclusion" *Law Offices of Lainey Feingold* (October 2020), available at https://www.lflegal.com/2020/10/ada-backlash/#What8217s-wrong-with-this-bill (visited 14 December 2020).

18 See National Council on Disability, "The Power of Digital Inclusion" (October 2011), available at https://ncd.gov/publications/2011/Oct042011 (visited 14 December 2020).

19 See eg, Vilissa Thompson, "How Technology and Social Media Assists People with Disabilities" *SWHelper* (August 2013), available at https://swhelper.org/2013/08/21/how-technology-and-social-media-assists-people-with-disabilities (visited 14 December 2020).

20 *Ibid*.

21 See Ekstrand, "Democratic Governance" (n. 16), 429.

22 See Perry Stein, "Disability Advocates Arrested During Health Care Protest at McConnell's Office" *Washington Post* (June 2017), available at https://www.washingtonpost.com/local/public-safety/

Washington, D.C., for occupying Senator Mitch McConnell's office in an attempt to show their disapproval of the healthcare program proposals.[23] Likewise, in recent year, and especially in 2020, black disabled people put together campaigns, organised events and spoke out about the oppression they continue to face and how they need new funding that goes "direct to the grassroots",[24] often using the hashtag ##Black DisabledLivesMatter.[25] The planning and the execution of such collective actions were only possible due to social media platforms' technological tools and algorithms.[26]

B. Artificial intelligence and big data algorithms

Similarly, much like social media platforms, artificial intelligence (AI) technology can also greatly assist individuals with disabilities. AI enables researchers to better understand disabilities and issues associated with them and enables people with disabilities to better manage them and address difficulties related to them, while overcoming challenging aspects in their lives.

Intelligent computer systems use "intelligent agents", which are programmed to do tasks that will result in specific outcomes.[27] Such agents learn from datasets on which algorithms can be run to achieve a recommended goal.[28] Machine learning, which is one form, among many other AIs, can be applied to a broader range of questions and offer good forecasts.[29] Additionally, machine learning systems adapt to changes very rapidly over time—when supplied with new data, learning algorithms instantly begin looking for new or unique patterns and refining earlier and preceding predictions.[30] Machine learning technologies are typically broken into two different categories: supervised machine learning and unsupervised machine learning.[31] Machine learning is considered supervised when datasets that include

---

disability-advocates-arrested-during-health-care-protest-at-mcconnells-office/2017/06/22/f5dd9992–576f-11e7-ba90-f5875b7d1876_story.html (visited 16 December 2020).

23 *Ibid*.

24 See eg, John Pring, "Disabled Black Lives Matter, Say Campaigners, and So Does Grassroots Funding" *Disability News Service* (October 2020), available at https://www.disabilitynewsservice.com/disabled-black-lives-matter-say-campaigners-and-so-does-grassroots-funding/ (visited 16 December 2020).

25 See eg, Victoria Marin Klaudia Amenabar, "For Disabled Black Americans, Police Violence Highlights the Intersecting Threat of Racism and Ableism" *Inside Edition* (July 2020), available at https://www.insideedition.com/for-disabled-black-americans-police-violence-highlights-the-intersecting-threat-of-racism-and-60702 (visited 16 December 2020).

26 See Ekstrand, "Democratic Governance" (n. 16).

27 Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* (Malaysia: Pearson Education, 3rd ed., 2009) p. 4 (noting that these programmes are designed "to achieve the best outcome or, when there is uncertainty, the best expected outcome").

28 Alan L Schuller, "At the Crossroads of Control: The Intersection of Artificial Intelligence in Autonomous Weapon Systems with International Humanitarian Law" (2017) 8:2 *Harvard National Security Journal* 379, 404.

29 See Packin, "Consumer Finance" (n. 11).

30 *Ibid*.

31 See generally Rachel Wilka, Rachel Landy and Scott A McKinney, "How Machines Learn: Where Do Companies Get Data for Machine Learning and What Licenses Do They Need?" (2018) 13:3 *Washington Journal Law, Technology & Arts* 217, 222–223.

expected results are used to help train the model. It includes algorithms that use input variables to forecast and predict a target categorisation, which may be categorical or continuous. Therefore, a supervised learning algorithmic system is considered successful if the designed system can successfully forecast the target result for a training dataset to a certain degree of correctness and be generalised to work with new datasets in addition to those used to train the system.[32]

Supervised machine learning algorithmic systems developed to help individuals with disabilities include algorithms created in connection with the closed captioning on Zoom.[33] This feature is just one of the several AI-empowered features that Zoom has put in place in order to improve access to all.[34] Similarly, because machine learning technology constantly tries to improve itself, it enables people who live with a disability—which a machine learning algorithm is attempting to help with—to constantly get better accommodations in real time.[35] For example, some machine learning technology applications that offer smart glasses help people with vision impairments to navigate when walking.[36] Leveraging supervised learning technology, the glasses are trained on millions of products, images of text and languages in order to be able to identify and interpret the correct image when such appears in their view.[37] Moreover, via supervised learning, individuals with disability using the technology can record their contacts' faces within seconds and the glasses will cycle through the device's programmed dataset to recognise the recorded person when that person comes into view again. Additionally, the glasses can even give the person who uses them clues about new faces that were not

32 *Ibid*.

33 In October 2020, it was reported that, thanks to a partnership between Zoom and accessibility company Otter.ai, the work on a Zoom's feature—meetings' live captioning—has been completed. See "Zoom joins forces with Otter.AI to improve Accessibility" *General News* (October 2020), available at https://mainecite.org/2020/10/zoom-joins-forces-with-otter-ai-to-improve-accessibility/ (visited 16 December 2020) ("Based on a sophisticated algorithm, Live Notes can separate human voices to identify different speakers and includes their name in the transcript to indicate that a given participant has started intervening").

Likewise, in the more medical context, see also Kayleigh K Hyde *et al*., "Applications of Supervised Machine Learning in Autism Spectrum Disorder Research: A Review" (2019) 6:2 *Review Journal of Autism and Development Disorders* 128, 129 (discussing AI systems that can help the medical community with Autism Spectrum Disorders diagnoses).

34 Zoom states on its site that "we strive to ensure that people of all abilities can meet and collaborate with one another by taking into consideration the wide range of hearing, vision, mobility, and cognitive abilities. Our teams adhere to the WCAG 2.1 AA recommendations while designing and developing every feature to ensure that accessibility considerations are not just nice-to-haves, but requirements in our development process". See Zoom's Accessibility Frequently Asked Questions, available at https://zoomgov.com/accessibility/faq (visited 26 December 2020).

35 *Ibid*.

36 See eg "OrCam: A New Vision for Machine Learning" *Harvard Business School, Technology and Operations Management* (November 2018), available at https://digital.hbs.edu/platform-rctom/submission/orcam-a-new-vision-for-machine-learning/ (visited 16 December 2020) (describing Orcam's device).

37 *Ibid*.

recognised, like describing a person's age, gender and general features.[38] Likewise, other smart devices help create an environment that is more accommodating of a diverse array of physical, cognitive and mental characteristics.[39]

Differently, in unsupervised machine learning, there are no training data, and the outcomes are unpredictable. The algorithms, therefore, solve problems using input datasets alone, with no reference or training data, by identifying patterns and grouping together reoccurring or analogous data characteristics.

Unlike supervised machine learning algorithms, which rely on categorised data, unsupervised algorithms use functions to discover properties of a dataset that were previously unknown, using uncategorised data. Unsupervised machine learning is used, for example, to study genetics. In particular, unsupervised machine learning clustering of DNA patterns is used to analyse evolutionary biology and to assign of high-risk and chronic disease patients into a discovered cluster.[40] Likewise, with the rate AI technologies are developing, autonomous cars, in the not so distant future, would be able to rely on sophisticated algorithms for complex activities, such as driving.[41]

And while the literature usually divides machine learning algorithms into supervised and unsupervised models, there is also a subcategory of machine learning referred to as "semi-supervised", which includes an algorithm operator that

38 *Ibid*.

39 Among the smart, commonly used automated devices and systems that AI technology currently offers are automatic light controls, automated doors and locks, automated appliances, automated medicine dispensing devices and even automated reminder systems. See "Home Automation for the Elderly and Disabled" *Smart Offices & Smart Homes: Michigan's Preferred Technology Provider*, available at https://smartofficesandsmarthomes.com/home-automation-for-the-elderly-and-disabled/ (visited 16 December 2020).

Although some argue, in general, that too much reliance on automation and people's growing dependence on AI are not necessarily positive things. See eg Rosen, "Automation for the People?" (n. 11); Packin, "Consumer Finance" (n. 11), 125 (discussing how people passively outsource more and more decision-making processes to technology tools and showing how individuals trust AI more than they trust human experts).

40 Christian Lopez, Scott Tucker, Tarik Salameh and Conrad S Tucker, "An Unsupervised Machine Learning Method For Discovering Patient Clusters Based On Genetic Signatures" (2018) 85:1 *Journal of Biomedical Informatics* 30 (using unsupervised machine learning technologies, the algorithms found patient clusters based on their genomic makeup, discovered significant variants between patient subgroups, found relationship between the genomic clusters and clinically relevant outcomes and assigned high-risk and chronic disease patients into a discovered cluster).

41 Victor Haydin, "What Does Unsupervised Learning Have in Store for Self-Driving Cars?" *Intellias* (August 2019), available at https://www.intellias.com/what-does-unsupervised-learning-have-in-store-for-self-driving-cars/ (visited December2020); Noah Rue, "How AI Is Helping People with Disabilities" *RollingWithoutLimits* (February 2019), available at https://www.rollingwithoutlimits.com/view-post/How-AI-Is-Helping-People-With-Disabilities#:~:text=Some%20of%20the%20AI%2Dassisted,regards%20to%20people%20with%20disabilities (visited 16 December2020) ("Self-driving cars use AI to help many different people, including those with hearing and vision impairments, those who use a wheelchair, people with learning disabilities, and so on. Being able to leave the house and drive yourself to the store is a major advancement for those with a disability in terms of accessibility as well as independent living").

uses a limited amount of categorised training data to inform a significantly larger uncategorised dataset.[42] Giving voice commands to Alexa—Amazon's virtual assistant—such as "turn off the lights", "play music", "tell me the news" or "order more toilet paper", creates an environment where a greater number of people can get certain tasks done easily[43] and independently. But such commercial AI personal assistant systems' ability to continue to improve within the rapid rate that they have thus far is to reorient ourselves towards semi-supervised and unsupervised machine learning.[44]

The distinctive learning and correlation-finding technological capacities of algorithmic systems are specifically attractive to those in the field of consumer ranking and rating. Scholars, journalists and other analysts have broadly discussed and debated worldwide development of "people-ranking" using high-level algorithms and big data in recent years.[45] This practice of social scoring is conceptually similar to financial credit scoring, in that an algorithmic system assigns a rating based on various data input. Social scoring, however, attempts to systematically rate people in their entirety (and not just their creditworthiness) based on social, reputational and even behavioural features (as opposed to credit history). Advocates of social scoring argue that the practice can reduce informational asymmetries and thus improve efficiency and inclusion while promoting good behaviour. On the other hand, critics raise many concerns especially in connection with algorithmic bias and error,[46] discrimination against certain populations as well as individuals,[47]

42 See Packin, "Consumer Finance" (n. 11), 123–124.

43 Tracy A Lustig and Caroline M Cilio, *Artificial Intelligence Applications for Older Adults and People with Disabilities: Balancing Safety and Autonomy*: Proceedings of a Workshop - in Brief (National Academies of Sciences, Engineering, and Medicine; Washington, DC: The National Academies Press) (2019), available at https://www.nap.edu/read/25427/chapter/1 (visited 16 December 2020).

44 Nick Statt, "Amazon's Alexa Isn't Just AI — Thousands of Humans are Listening" *The Verge* (April 2019), available at https://www.theverge.com/2019/4/10/18305378/amazon-alexa-ai-voice-assistant-annotation-listen-private-recordings (visited 16 December 2020).

45 Addressing this (in 2019), New York State passed a legislation that is meant to prevent algorithmic systems from discriminating against users of social media. See Nizan Geselvich Packin, "Social Credit: Much More than Your Traditional Financial Credit Score Data" *Forbes* (December 2019), available at https://www.forbes.com/sites/nizangpackin/2019/12/13/social-credit-much-more-than-your-traditional-financial-credit-score-data/#367121f55a82 (visited 16 December 2020).

46 See generally Cathy O'Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy* (New York, NY: Crown Publishers, 2016) p. 3 (many mathematical predictive models "encode human prejudice, misunderstanding, and bias . . ."); Solon Barocas and Andrew D Selbst, "Big Data's Disparate Impact" (2016) 104:3 *California Law Review* 671, 674–675 (explaining that "data mining can reproduce existing patterns of discrimination, inherit the prejudice of prior decision makers, or simply reflect the widespread biases that persist in society").

47 See, eg, Danielle Keats Citron and Frank Pasquale, "The Scored Society: Due Process for Automated Predictions" (2014) 89:1 *Washington Law Review* 1, 13–16 (explaining that credit-scoring algorithms "systematiz[e] [discriminatory practices] in hidden ways" (footnote omitted)); Andrew D Selbst, "Disparate Impact in Big Data Policing" (2017) 52:1 *Georgia Law Review* 109, 120–123 (discussing examples of discrimination by algorithms, such as "'black-sounding' names to criminal records"); Margaret Hu, "Algorithmic Jim Crow" (2017) 86:2 *Fordham Law Review* 633, 662–663 (explaining that AI systems are "not immune to inherent racial biases").

manipulation of users,[48] individuals' privacy violations,[49] asymmetrical market powers and even social segregation.[50]

III. Disability in the Era of Digital Technology, Social Networks and AI Systems—the Problem of Algorithmic Prejudice

The implications of the shift towards assessing, ranking and rating individuals manifests in the experiences of people with a variety of disabilities—a group that has so much to benefit from advancements of digital technology and social media platforms but, as it seems, also much to lose. As these shifts happen both in the public and in the private sectors, it has been proving extremely discriminatory, with consequences encompassing different aspects of life ranging from insurance premiums to hiring decisions and even social security benefits and criminal prejudice.

A. Algorithmic biases against disabled people

Philosophy of science theories long argued that technology is never neutral.[51] Technologies have politics embodying social relations and typically represent the agendas of those that have designed them.[52] Digital technologies, social network platforms and big data-based AI systems are not an exception to this general axiom

48 See, eg, Anupam Chander, "The Racist Algorithm?" (2017) 115:6 *Michigan Law Review* 1023, 1024 (explaining how "legal scholars are increasingly sounding the alarm on this unfettered algorithmic control. Jonathan Zittrain worries that a company like Facebook could even decide an election without anyone ever finding out. Ryan Calo warns that companies may be manipulating us through advertising. Call this the problem of algorithmic manipulation").

49 See, eg, Zeynep Tufekci, "Algorithmic Harms Beyond Facebook and Google: Emergent Challenges of Computational Agency" (2015) 13:2 *Colorado Technology Law Journal* 203, 209 (describing how "[t]he privacy, surveillance, and civil rights implications of big data have all recently become the focus of increased scrutiny. Most reports focus on the misuse of data originally disclosed by the user, or on the aggregation of data by entities such as data brokers").

50 Nizan Geslevich Packin and Yafit Lev-Aretz, "Big Data and Social Netbanks: Are You Ready to Replace Your Bank?" (2016) 53:5 *Houston Law Review* 1211; Nizan Geslevich Packin and Yafit Lev-Aretz, "On Social Credit and the Right to Be Unnetworked" (2016) 2016:2 *Columbia Business Law Review* 339.

51 Several decades ago, political scientist Langdon Winner posited the widely discussed thesis that technologies always reflect the political agendas of their creators. See Langdon Winner, *The Whale and the Reactor: A Search for Limits in the Age of High Technology* (Chicago, IL: The University of Chicago Press, 1986) pp. 19, 19–39. In the chapter titled "Do Artifacts Have Politics?" Winner claimed that technology both emerges from and creates social foundations.

52 See Nizan Geslevich Packin, "Regtech, Compliance and Technology Judgment Rule" (2018) 93:1 *Chicago-Kent Law Review* 193, 215 (explaining that "[u]nder Winner's thesis, technologies have politics in two ways. Either (i) 'the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in the affairs of a particular community'; or (ii) the systems are 'inherently political technologies,' which 'appear to require or to be strongly compatible with particular kinds of political relationships,' technical arrangements and social order . . . The most commonly cited example from Winner's work involves the segregationist politics embodied in the height of the bridges over parkways in Long Island, New York. But Winner gives other examples of consciously political design").

as are, in general, algorithms that are never truly objective. Algorithms are based on the assumptions of those who designed them, and therefore embed in them ethical guidelines,[53] as to what is right or wrong, and what is the "right thing" to do,[54] in morally challenging situations. Determining the right thing is "fundamentally an ethics problem".[55] Therefore, programmers must be conscious of the implicit ethical choices they make when designing algorithms and must examine moral and ethical principles *ex ante* so that these choices are clear and consistent.[56]

So how exactly can programmers determine which ethical principles to install in algorithms? A recent study surveying moral and ethical principles regarding which individuals' lives or health society should prioritise proved very interesting in this context. In a 2018 Massachusetts Institute of Technology study, titled "The Moral Machine Experiment",[57] scholars examined people's answers to a series of trolley dilemma-type questions that were meant to understand individuals' moral preferences for male, female, young, elderly, low-status or high-status pedestrians given a fictional car accident.[58] Millions of people from 233 jurisdictions gave approximately 40 million answers to the scholars, who then mapped the international ethical inclinations and checked for demographic variations. Interestingly, the results varied significantly in two parts of the world: survey takers from East Asian countries preferred saving the elderly over the young, while most of the Western countries survey takers, chose the opposite.[59] So what is the preferred ethical standard that programmers designing algorithms should then follow when prioritising algorithms that need to make such decisions—for example, in autonomous cars? Should algorithms value the life of individuals with disabilities less than those of able-bodied individuals? For example, should a blind individual walking with a white cane be valued less than an individual able to walk, or should obese people experiencing physical limitations be considered less valuable to society than athletic people?[60] If such moral principles and rankings actually do exist within minds of most people, these assumptions will make their way into the algorithms people design. Ultimately then, with regard to issues in which the majority of the

53 Joshua Greene *et al*., "Embedding Ethical Principles in Collective Decision Support Systems" (2016) 30 *Proceedings Aaai Conference on Artificial Intelligence* 4147.

54 Kris Hammond, "Ethics and Artificial Intelligence: The Moral Compass of a Machine" *Recode* (April 2016), available at http://www.recode.net/2016/4/13/11644890/ethics-and-artificial-intelligence-the-moral-compass-of-a-machine (visited 16 December 2020).

55 Patrick Lin, "Why Ethics Matters for Autonomous Cars" in Markus Maurer *et al*. (eds), *Autonomous Driving: Technical, Legal, And Social Aspects* (Berlin Germany: Springer, 2016) pp. 69, 73.

56 Bryan Casey, "Amoral Machines, or: How Roboticists Can Learn to Stop Worrying and Love the Law" (2017) 111 *Northwestern University Law Review Online* 231, 233–234; Wendell Wallach and Colin Allen, *Moral Machines: Teaching Robots Right from Wrong* (Oxford, UK: Oxford University Press, 2010) p. 16.

57 See generally Edmond Awad *et al*., "The Moral Machine Experiment" (2018) 563 *Nature* 59.

58 Han-Wei Liu and Ching-Fu Lin, "Artificial Intelligence and Global Trade Governance: A Pluralist Agenda" (2020) 61:2 *Harvard International Law Journal* 407, 428.

59 *Ibid*.

60 See Sheri Byrne-Haber, "Disability and AI Bias" *Medium* (July 2019), available at https://sheribyrnehaber.medium.com/disability-and-ai-bias-cced271bd533 (visited 16 December 2020).

population holds biases against persons with disabilities, the result will be AI systems that discriminate against persons with disabilities.

B. Big data algorithms and technology-enabled discrimination in the public sector

Administrations are gradually turning more and more to algorithms and digital platforms to decide if and to what extent individuals should receive key benefits for programmes such as Medicaid, Medicare and Social Security Disability.[61]

(i) The social security administration

The Social Security Administration (SSA), an independent agency of the US federal government that administers Social Security—a social insurance programme consisting of retirement, disability and survivors' benefits –recently started using social media to further investigate and rank applicants and citizens,[62] like many other agencies.[63] Particularly, the SSA-administered Social Security Disability Insurance (SSDI), a programme that pays monthly benefits to individuals who have become disabled before reaching retirement age and are not able to work, started to

61 Lydia XZ Brown, Michelle Richardson, Ridhi Shetty and Andrew Crawford, "Report: Challenging the Use of Algorithm-driven Decision-making in Benefits Determinations Affecting People with Disabilities" *Center for Democracy and Technology* (October 2020), available at https://cdt.org/insights/report-challenging-the-use-of-algorithm-driven-decision-making-in-benefits-determinations-affecting-people-with-disabilities/ (visited 26 December 2020). For full report, see: https://cdt.org/wp-content/uploads/2020/10/2020-10-21-Challenging-the-Use-of-Algorithm-driven-Decision-making-in-Benefits-Determinations-Affecting-People-with-Disabilities.pdf (visited 26 December 2020) [hereinafter *CDT Report*].

62 See eg Mark Miller, "U.S. Government Weighs Social-Media Snooping to Detect Social Security Fraud" *Reuters* (March 2019), available at https://www.reuters.com/article/us-column-miller-socialmedia/u-s-government-weighs-social-media-snooping-to-detect-social-security-fraud-idUSKCN1RA12R (visited 26 December 2020).

63 See for example, several years ago, the Internal Revenue Service, which is the revenue service of the United States federal government, has created a new division, which uses data analytics to mine all the types of information that can be found available online, including information from social networks. Dara Kerr, "Tax Dodgers Beware: IRS Could Be Watching Your Social Media" *Cnet* (April 2014), available at http://www.cnet.com/news/tax-dodgers-beware-irs-could-be-watching-your-social-media (visited 16 December 2020) ("This information is then added to the existing information that is used to identify noncompliant taxpayer behaviors. Similarly, in recent years it has been reported that in the United Kingdom, Her Majesty's Revenue and Customs (HMRC), a non-ministerial department of the government responsible for taxation and minimum wages related issues, developed a new software to trawl billions of pieces of information to search and find individuals who have underpaid tax. Reportedly, this system could get access to even more data, which can be shared with approximately 6o different countries"). See Nizan Geslevich Packin and Yafit Lev Aretz, "Algorithmic Analysis of Social Behavior for Profiling, Ranking, and Assessment" in Woodrow Barfield and Ugo Pagallo (eds.) *Cambridge Handbook on the Law of Algorithms* (Cambridge UK: Cambridge University Press, 2020) 153; Richard Dyson, "What Does The Taxman Know About You, Your Finances And Your Lifestyle?" *The Telegraph* (June 2015), available at http://www.telegraph.co.uk/finance/personalfinance/tax/11697816/What-does-the-taxman-know-about-you-your-finances-and-your-lifestyle.html (visited 16 December 2020).

rely in its decision-making on digital systems. The SSDI provides a small amount of monthly financial support—the average is about $1,200—for individuals who are assessed and declared to be sufficiently disabled, based on one's ability to work and the harshness of a relevant condition.[64] The criteria to qualify for SSDI are very high[65] and many individuals with disabilities who cannot work find themselves needing to wait for years in order to actually get their benefits. Nonetheless, like with all government welfare systems, some individuals try to defraud or illegally take advantage of the procedures. Covering overpayment cases, media reports demonstrated that, although the SSA administered billions in fraudulent payments between 2011 and 2015, overpayment funds amounted to just over 1 per cent of the total outlays.[66] Yet, notwithstanding the significance of the programme, and the typical overpayment rates, in 2019, the US government declared its decision to launch a programme to check-up on claimants on social media platforms like Facebook and Twitter, with the intention to root-out fraud and abuse in the disability programme.[67]

It may seem odd that the government initiated such a sophisticated and invasive programme in response to a minimal issue (yet one that has generated a moral panic for decades).[68] Nevertheless, excessive monitoring of disabled persons is actually common. Some able-bodied people perceive individuals with disabilities who try to exercise their rights as imposters who are not disabled and therefore do not deserve any "special treatment".[69] In addition, even if there was evidence of a large-scale malfeasance and fraud, attempting to judge and decide disability by

64 Center on Budget and Policy Priorities, "Chart Book: Social Security Disability Insurance" (updated September 2019), available at https://www.cbpp.org/research/social-security/chart-book-social-security-disability-insurance (visited 26 December 2020). For full Chart Book: https://www.cbpp.org/sites/default/files/atoms/files/7-21-14socsec-chartbook.pdf (visited 26 December 2020).

65 Alex Smith, "Long Waits and Long Odds for Those who Need Social Security Disability" *NPR* (June 2017), available at https://www.npr.org/sections/health-shots/2017/06/13/531207430/people-with-unseen-disabilities-could-suffer-under-new-government-rules (visited 26 December 2020).

66 Michelle Ye Hee Lee, "White House Budget Director's Claim That Social Security Disability is 'Very Wasteful'" *Wash. Post* (April 2017), available at https://www.washingtonpost.com/news/fact-checker/wp/2017/04/07/white-house-budget-directors-claim-that-social-security-disability-is-very-wasteful/?utm_term=.6db11d9b19c5 (visited 16 December 2020).

67 David M Perry, "The Trump Administration Wants to Snoop on Disabled Americans" *Medium* (March 2019), available at https://medium.com/s/story/the-trump-administration-wants-to-snoop-on-disabled-americans-f2fcaae78ad3 (visited 16 December 2020).

68 See Doron Dorfman, "Fear of the Disability Con: Perceptions of Fraud and Special Rights Discourse" (2019) 53:4 *Law and Society Review* 1051, 1062. For a concrete example of the efforts of the Reagan administration to stop Social Security fraud in the 1980s, see *id*.,1056–1057.

69 *Ibid*., pp. 1061–1062. This results in private policing situations by "self-appointed guardian[s]" of the law that may deter individuals with disabilities from wanting and trying to exercise their rights in public, or even worse, it could result in violent retaliation against suspected "disability cons". See also Doron Dorfman, "[Un]Usual Suspects: Deservingness, Scarcity, and Disability Rights" (2020) 10:2 *U.C. Irvine Law Review* 557, 599–603 (citing original interview data with federal law enforcement personnel and quoting Howard Cohen, "He Was Confronted Over a Handicapped Parking Spot, Cops Say. Now He's Fighting for His Life" *Miami Herald* (July 2018), available at https://www.miamiherald.com/news/local/crime/article215084395.html (visited 16 December 2020)).

monitoring or spying on the social media accounts of those suspected to be conning government systems, pretending to be disabled, cannot be viewed positively. It is, at best, an exercise in bias confirmation and, at worst, represents an expansion of the surveillance state concept, that is targeting some of the most vulnerable individuals among us and making their already challenging lives and daily realities become even more challenging.

Using AI algorithms increases the federal government's capability to scrutinise the social media accounts of Americans living with various types of disabilities, in order to guarantee that they are not "gaming the system".[70] The government's new AI system also assesses posts and photos posted online that in the government's view (or is it in the programmers creating the algorithms' view? One must wonder who sets the standard for that) do not always provide reliable evidence of individuals' current physical condition.[71] The plan, which became public in the 2019 annual SSA budget proposal,[72] depends on the administration's ability to find pictures and posts that can allow a determination of whether or not people are faking a disability and corresponds with government intentions to cut SSDI.[73]

Indeed, government initiatives of cutting services for individuals with disabilities, based on algorithmic decision-making systems, have become more prevalent. For example, in Indiana, the Family and Social Services Agency published its intent to use a new algorithmic system to examine and automate welfare eligibility decisions as a way of fighting fraud and reducing wasteful spending.

The governor who oversaw the process stated that he wanted to dramatically lower the number of welfare-dependent recipients.[74] Relatedly, in 2019, the D.C. Department of Health Care Finance retained tech companies' services to conduct algorithm-driven assessments to make eligibility determinations for the Elderly and Persons with Disabilities Waiver.[75] Shortly after the algorithmic assessments went into effect, hundreds of individuals with disabilities' home care hours were drastically cut, creating gaps for individuals who rely on such care, while others' eligibility was terminated upon reassessment.[76] Sadly, such cuts in care hours can

70 Rabia Belt and Doron Dorfman, "Reweighing Medical Civil Rights" (2020) 72 *Stanford Law Review Online* 176, 180.

71 Robert Pear, "On Disability and on Facebook? Uncle Sam Wants to Watch What You Post" *NY Times* (March 2019), available at https://www.nytimes.com/2019/03/10/us/politics/social-security-disability-trump-facebook.html visited 16 December 2020); See eg, Mark Miller, "U.S. Government Weighs Social-Media Snooping to Detect Social Security Fraud" *Reuters* (March 2019), available at https://www.reuters.com/article/us-column-miller-socialmedia-idUSKCN1RA12R (visited 16 December 2020).

72 See Social Security Administration, "Fiscal Year Budget Overview" (2020), available at https://www.ssa.gov/budget/FY20Files/2020BO.pdf (visited 16 December 2020).

73 Sean Williams (The Motley Fool), "Trump Outlines a Significant Social Security Cut in His 2020 Budget" *yahoo! finance* (March 2019), available at https://finance.yahoo.com/news/trump-outlines-significant-social-security-102100661.html (visited 26 December 2020).

74 See Brown *et al*., *CDT Report* (n. 61).

75 *Ibid*., 61.

76 Tara Bahrampour, "District Residents Say Cuts in Medicaid Home Care Hours Leaves Them Vulnerable" *Washington Post*. (March 2019), available at https://www.washingtonpost.com/local/social-issues/

lead to institutionalisation in nursing facilities and, consequentially, segregation, isolation, increased risk of early death, abuse, neglect and more exposure to diseases,[77] including COVID-19.[78]

(ii) AI discrimination in criminal justice government agencies

Another public sector example includes the many cases when criminal justice government agencies use data-sharing digital technologies and big data algorithms to circulate mental-health-related data for various predictive and preventative purposes,[79] none of which occurs with the goal to help individuals with disabilities or benefit them. For instance, it has been reported that in the United States, advisors to the Trump administration promoted "experimentation to determine 'whether technology, including phones and smartwatches, can be used to detect when mentally ill people are about to turn violent'".[80] Likewise, in Canada, in 2017, the Office of the Privacy Commissioner of Canada "found that the Toronto Police Service had released mental health and suicide data which led to Canadians with a documented history of suicide attempts or mental health hospitalisations being refused entry at the US border".[81]

C. Big data algorithms and technology-enabled discrimination in the private sector

In the private sector, information is now easily discoverable by anyone who can conduct digital searches and has access to the Internet—including employers.[82]

---

district-residents-say-cuts-in-medicaid-home-care-hours-leave-them-vulnerable/2019/03/08/bdbe1878–3eb5–11e9–922c-64d6b7840b82_story.html (visited 14 December 2020).

77 See generally U.S. Gov't Accountability Off., GAO-19–433, "Nursing Homes: Improved Oversight Needed to Better Protect Residents from Abuse" (June/July 2019), available at https://www.gao.gov/products/GAO-19-433 (visited 16 December 2020) (providing highlights and a full report about abuse citations in nursing facilities).

78 Minorities with disabilities suffer even more. See Priya Chidambaram and Tricia Neuman, "Racial and Ethnic Disparities in COVID-19 Cases and Deaths in Nursing Homes" *KFF* (October 2020), available at https://www.kff.org/coronavirus-covid-19/issue-brief/racial-and-ethnic-disparities-in-covid-19-cases-and-deaths-in-nursing-homes/ (visited 16 December 2020).

79 Emaline Friedman, "Disability and Mental Health Discrimination in Artificial Intelligence Systems" *MadInAmerica* (October 2020), available at https://www.madinamerica.com/2020/10/disability-mental-health-discrimination-artificial-intelligence-systems/ (visited 14 December 2020).

80 Piers Gooding, "On Disability Discrimination, Mental Health, and Algorithmic Accountability" *Submission to the Australian Human Rights Commission - Human Rights and Technology Discussion Paper* (May 2020), available at https://www.researchgate.net/publication/341298633_Submission_to_the_Australian_Human_Rights_Commission_-_Human_Rights_and_Technology_Discussion_Paper_-_On_Disability_Discrimination_Mental_Health_and_Algorithmic_Accountability (visited 14 December 2020).

81 *Ibid*.

82 See, eg, Julie Appleby, "Workplace Wellness Plans Offer Big Incentives, But May Cost Your Privacy" *NPR* (September 2018), available at https://www.npr.org/sections/health-shots/2018/09/22/649664555/workplace-wellness-plans-offer-big-incentives-but-may-cost-your-privacy (visited 14 December 2020).

(i) AI-based discrimination in hiring

Whether employers use public information when using AI systems to screen applicants or not, algorithms often incorporate disability discrimination by default. Indeed, machine learning algorithms are trained to look for certain characteristics, as they rely on past examples, which are their training datasets, and based on those they find correlations and recognised patterns to predict how well candidates would fare.[83] These training datasets include illustrations of what constitutes "good employees", reflecting information on individuals that scored well by a specific type of quantifiable metric, compared with unsuccessful employees, which did not.[84] The AI algorithm will then learn everything there is to know about those illustrations, in order to recognise and find patterns, which it will then use to predict if other individuals will be good employee or not.

Understanding this process, concerned commentators focus on AI bias with respect to gender and race.[85] However, the impact that such algorithms has with respect to individuals with disabilities receives minimal attention, although such

83 Jason R Bent, "Is Algorithmic Affirmative Action Legal?" (2020) 108:4 *Georgetown Law Journal* 803, 809–810; Harry Surden, "Machine Learning and Law" (2014) 89:1 *Washington Law Review* 87, 89–91 ("Such algorithms are designed to detect patterns among data").

84 As Amazon's experience illustrates, even the companies most famously known for creating effective and sophisticated algorithms can get them wrong. Amazon's "experimental hiring tool" discriminated because it relied on a machine learning algorithm to search the Internet and mechanically identify and rank potential job candidates. This automated process encoded pre-existing bias reflected in the data that the algorithm uses as its training set, and so Amazon's system basically taught itself that female candidates were inferior to male candidates. See Jeffrey Dastin, "Amazon Scraps Secret AI Recruiting Tool that Showed Bias Against Women" *Reuters* (October 2018), available at https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G (visited 14 December 2020) ("It penalized resumes that included the word 'women's,' as in 'women's chess club captain.' And it downgraded graduates of two all-women's colleges . . . [t]he algorithm was trained on data from employment applications actually received by Amazon over a ten-year period, and most of those applications were received from men, reflecting a social phenomenon that men tend to dominate employment in technology fields"); see also Jordan Weissmann, "Amazon Created a Hiring Tool Using A.I. It Immediately Started Discriminating Against Women" *Slate* (October 2018), available at https://slate.com/business/2018/10/amazon-artificial-intelligence-hiring-discrimination-women.html (visited 14 December 2020).

85 There is plenty of literature in recent years on the biases inherent in digital technology, algorithmic processing and hiring. See, eg Stephanie Bornstein, "Antidiscriminatory Algorithms" (2018) 70:2 *Alabama Law Review* 519, 530 ("current scholarship on algorithmic discrimination expresses concern that Title VII may be unable to reach the discriminatory harms caused by this innovation"); Tufekci, "Algorithmic Harms Beyond Facebook" (n. 49), 217 ("For example, rather than race, a hiring algorithm could discriminate based on correlates of race, which would result in a workforce that excluded certain racial backgrounds. This could be done by hiring people based on 'commuting distance to work,' a factor that companies working on algorithmically calculating the potential success of newly hired employees have already found to be correlated to a low-degree of employee turnover. Such a criterion would not directly target race, but given the residential segregation patterns in many cities around the United States, could easily effectively do so"); and Joseph Blass, "Algorithmic Advertising Discrimination" (2019) 114:2 *Northwestern University Law Review* 415, 419 (discussing sex discrimination and Facebook's employment advertising algorithms).

bias is also important.[86] First, although a significant enough segment of the overall population deals with a certain disability, such disabilities come in such a large variation of shapes and forms, that it is essentially impossible to detect, prove and design around one type of disability bias.[87] The situation is especially bad for those who find themselves in the subcategory of minorities or women who also have disabilities or disabled people of colour.[88] This is a real problem—experts have argued that "the range of characteristics of disability is very, very broad", and this broad spectrum greatly contributes to the algorithmic discrimination issue.[89] Essentially, the broad spectrum makes it difficult, if not impossible, for programmers to account for differences in physical and mental characteristics when designing algorithms. And if programmers cannot account for such differences *ex ante*, there is an inherent problem with algorithms trying to interpret the actions, behaviour patterns and gestures of individuals with disabilities—there are not enough of them to be properly represented in training datasets.[90] In fact, there are by far fewer people with physical or mental disabilities than there are any other group, including women, or even people of colour—two typical groups that often suffer from bias.[91]

Second, employment algorithms' training sets are based on traditional applicants without disabilities. So, if disabled individuals' facial attributes or mannerisms are different than the norm, they will get no credit, or maybe even "get penalized" in their scores, even if their traits would be as beneficial to the job. For example, employment algorithms can review applicants' characteristics, which are as specific as individuals' enunciation, their grammar or even whether they speak at a particular pace—all qualities that the algorithms could then equate with more

86 Mason Marks, "Algorithmic Disability Discrimination" in I Glenn Cohen *et al*. (eds), *Disability, Health, Law and Bioethics* (Cambridge, UK: Cambridge University Press, 2020) p. 242, available at https://ssrn.com/abstract=3338209 (visited 14 December 2020).

87 Alexandra Reeve Givens, "How Algorithmic Bias Hurts People With Disabilities" *Slate* (February 2020), available at https://slate.com/technology/2020/02/algorithmic-bias-people-with-disabilities.html (visited 14 December 2020) (explaining that "[t]he diverse forms of disability make it virtually impossible to detect adverse impact with the type of auditing that companies currently use: to show with statistical significance, for example, that people whose autism presents in a particular way are faring less well on the test than other applicants. There simply are not enough data points to see how different autistic candidates are being impacted, especially since many people choose not to disclose their disability status. While some have called to fix this data problem by collecting more detailed information about job candidates' disabilities, further collection raises its own distinct and very real concerns about privacy and discrimination").

88 See eg Karina Hernandez, "People with Disabilities are Still Struggling to Find Employment — Here are the Obstacles They Face" *CNBC* (March 2020), available at https://www.cnbc.com/2020/03/02/unemployment-rate-among-people-with-disabilities-is-still-high.html (visited 14 December 2020) ("[o]ther complex issues contribute to the unemployment rate, especially when looking into racial demographics of people with disabilities").

89 Sheri Byrne-Haber, "Disability and AI Bias" *Medium* (July 2019), available at https://sheribyrnehaber.medium.com/disability-and-ai-bias-cced271bd533 (visited 14 December 2020).

90 *Ibid*.

91 *Ibid*. For example, "facial recognition will be biased against people who have had significant facial surgery", or "[p]eople with mobility problems may be falsely identified by self-driving cars as objects". *Ibid*.

effective or less effective type of an employee. An ideal salesperson, for instance, could be defined as someone who speaks in a certain defined way, with a certain intonation, or in a certain recognisable manner. Likewise, an algorithm's programmers could even design it to interpret the particular body gestures of an applicant—does he or she lean forward with just one arm or does he or she keep her hands close to his or her body? Each of these gestures could be interpreted as showing signals of self-confidence or comfort, according to what previous high-performing salespersons did or did not display.[92] The AI system would have identified this relationship from the training datasets, which could be videos of interviews and the sales outcomes that were gathered from existing employees' records. But individuals with disabilities would constantly end up at a disadvantage if their qualities manifest physically in a way that an algorithm has not seen in prior training datasets.[93]

Last, a major concern in the context of discrimination in hiring individuals with disabilities is that it is questionable whether the ADA[94] or other laws can currently successfully prevent employers from using big data algorithms-derived information about individuals in hiring decisions. The ADA's employment protections primarily regard accommodations. The ADA protects the "qualified person with a disability", meaning if the applicant was qualified and the disability was not an essential function to perform the job.[95] Ultimately, facially neutral algorithms that encapsulate latent biases may prove to be a helpful defence for employers.

(ii) Discrimination in insurance and health-related issues

Algorithmic discrimination against persons with disabilities is also occurring and growing with respect to the provision of private sector services. As technology continues to develop, and more and more information about individuals' health-related

92 Alex Engler, "For Some Employment Algorithms, Disability Discrimination by Default" *Brookings Institution* (October 2019), available at https://www.brookings.edu/blog/techtank/2019/10/31/for-some-employment-algorithms-disability-discrimination-by-default/ (visited 14 December 2020).

93 *Ibid*. The Brookings Institution has also expressed concerns about using employment algorithms based on AI, because if an applicant with a disability manifests facial features or mannerisms while his or her interview is being videotaped, and the algorithm does not recognise these gestures or expressions, that individual's application and candidacy will get a low score. See also Hernandez, "People with Disabilities are Still Struggling to Find Employment" (n. 88) ("What ends up happening in the process is that people with disabilities are being screened out because they don't present in ways that are considered normative by these algorithmic assessments").

94 See the ADA 42 USC §§ 12101 *et seq*. Congress amended the ADA with the American with Disabilities Act Amendments Act, 42 USC §§ 12101 *et seq*. and instructed courts that the "definition of disability . . . shall be construed in favor of broad coverage of individuals". 42 USC § 12102(4)(A). It also guided them to interpret "an impairment" as something that "substantially limits one major life activity need not limit other major life activities in order to be considered a disability". *Id*., § 12102(4)(C). See *Woolf v Strada*, 949 F.3d 89, 94 (2d Cir. 2020).

95 David M Perry, "Job Discrimination in Plain Print" *America Aljazeera* (February 2016), available at http://america.aljazeera.com/opinions/2016/2/job-discrimination-in-plain-print.html (visited 14 December 2020) (discussing job ads that list a number of non-essential functions for the job to screen out people with disabilities).

habits, daily behaviour patterns, athletic preferences and capabilities,[96] genetics information and family biological background[97] becomes digitally available, the possibility of algorithmic discrimination in an ever-expanding list of areas grows greater. Indeed, such information is extremely relevant to the business of insurance companies and employers, among others, who would love to get their hands on it for various assessment, ranking and billing proposes.

Last, also in the private sector, reports have discussed the concerning use of AI-based suicide alerts empowered by Facebook's pattern recognition algorithms that operate entirely autonomously and outside of the healthcare system and its ethical standards.[98] There have also been reports of constant electronic monitoring of social service provision by private companies, like home visits, as well as the provision of psychiatric drugs that include in-built sensors to track medication compliance.[99] Thus, in today's reality, individuals with mental or physical disabilities must understand the potential harms as well as the benefits when consenting to treatments with leading-edge technologies, as often such digital technologies entail undesired human rights implications for those individuals and society as a whole. Yet it is basically impossible to have all individuals with disabilities weigh the benefits and disadvantages, or even analyse how such AI systems work.

---

96 Elizabeth A Brown, "The Fitbit Fault Line: Two Proposals to Protect Health and Fitness Data at Work" (2016) 16:1 *Yale Journal Health Policy, Law, and Ethics* 1, 48 (explaining that "health data collected from wearable technology may affect" employment decisions, partly also because of the insurance premium-related consequence, and individuals' status in ways that US law has never before enabled); Anna Mizzi, "Profiting on Your Pulse: Modernizing HIPAA to Regulate Companies' Use of Patient-Consumer Health Information" (2020) 88:2 *George Washington Law Review* 481 (explaining how technology knows the most intimate details of people's lives, such as their exercise and eating habits or even their difficulty to conceive children).

97 See generally Bradley A Areheart and Jessica L Roberts, "GINA, Big Data, and the Future of Employee Privacy" (2019) 128:3 *Yale Law Journal* 710. Interestingly enough, genetic testing is typically treated as a type of medical examination, and therefore traditionally conducted in the healthcare and medical industry. See "What is Direct-to-Consumer Genetic Testing?" *MedlinePlus* (September 2020), available at https://medlineplus.gov/genetics/understanding/dtcgenetictesting/directtoconsumer/ (visited 14 December 2020). Since 2018, MyHeritage, one of the bigger genetic testing companies, started using DNA testing not just in order to provide ancestry services but also to offer comprehensive health reports from their testing. See "MyHeritage Expands to Health; Launches New DNA Test Offering Powerful and Personalized Health Insights for Consumers" *BusinessWire* (May 2019), available at https://www.businesswire.com/news/home/20190520005426/en/MyHeritage-Expands-Health-Launches-New-DNA-Test (visited 16 December 2020). A major problem, however, with such testing is that many of them are not regulated. See Nat'l Hum. Genome Res. Inst., "Regulation of Genetic Tests" (last updated 25 September 2020), available at https://www.genome.gov/about-genomics/policy-issues/Regulation-of-Genetic-Tests (visited 16 December 2020). And while the Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110–233, 122 Stat. 881 (2008) (GINA) does give people some type of protection by restricting health insurers and employers from discriminating against specific groups of individuals based on genetic data, it offers limited protection in connection with life insurance, long-term care insurance, disability insurance or preventing health insurers from using genetic results in determining insurance payments. Pascal Su, "Direct-to-Consumer Genetic Testing: A Comprehensive View" (2013) 86:3 *Yale Journal Biology and Medicine* 359, 361.

98 See Mason Marks, "Artificial Intelligence Based Suicide Prediction" (2019) 21:3 *Yale Journal of Law and Technology* 98.

99 *Ibid*.

IV. Disabling the Harmful Algorithmic Impact against the Disabled

There are ways to combat and minimise the discriminatory harms resulting from using digital and algorithmic systems in connection with the personal, social and professional lives of individuals with disabilities.

A. Innovating in an inclusive way

Being innovative and constantly exploring existing anti-discrimination laws to guarantee that they do not inadvertently bless discriminatory systems is simply not enough. People with disabilities are at high risk of being left out of innovations for several reasons. First, businesses, institutions and even government agencies do not capture enough data about individuals with disability.[100] This impacts their ability to be able to produce effective and efficient algorithms that will be capable of detecting the different types of disabilities, prove them and design around disability bias. Second, the quality of the data available on individuals with disabilities is far from ideal, or representative, which is especially problematic, given the dependence of AI systems on historic data patterns.[101] Third, technological literacy issues among potential users of algorithms, as well as their limited ability to be able to afford newer, more advanced technologies, narrow access to innovation[102] and reduce the incentive and ability of the developers of such technologies' ability to test and improve them. Last, the creation, development and design of new technologies must involve more people with disabilities in the process, including in the training of AI systems stages, especially since there are not as many people with disabilities out there as there are women or minorities.

B. Regulatory solutions

We cannot put the AI systems' genie back into the bottle, but we still want to be able to enjoy the benefits that digital systems and big data algorithms bring to individuals with disabilities. Therefore, we must figure out ways to regulate the permitted and non-permitted usages of such systems.[103] This is possible to do so. New York State, for example, has recently focused on preventing digital usages that can cause great harm to individuals. On 25 November 2019, Governor Cuomo signed a legislation

100 Lustig and Cilio, *Artificial Intelligence Applications for Older Adults and People with Disabilities* (n. 43).

101 *Ibid*.

102 *Ibid*.

103 See generally Packin and Lev-Aretz, "Big Data and Social Netbanks" (n. 50) (discussing the need to have people enjoy the networking and digital platforms' benefits, while limiting their negative social credit exposure).

(S.2302/A.5294),[104] prohibiting consumer reporting agencies and lenders from using certain information to determine an individual's creditworthiness.[105] Moreover, the bill specifically prohibits determining an individual's creditworthiness by using the credit scores of people in that individual's social network.[106]

New York State did not invent this concept. Limiting the information that can be used to assess and rank people is hardly new. For instance, limitations exist in the context of medical information—while an individual's terminal illness could considerably affect his or her ability to repay a loan, regulation restricts the use of specific medical data for credit scoring purposes.

Likewise, as for insurance companies, among others, that would want to get access to digital data concerning individuals' health, athletic preferences and genetics background, for various assessment, ranking and insurance underwriting proposes, similar limitations on the use of prohibited data can also be put in place. For example, on 18 January 2019, the New York State Department of Financial Services issued an insurance circular with guiding principles on the use of alternative data in life insurance underwriting. Specifically, insurers must independently determine that external data sources do not collect or use prohibited criteria and should not use external data, unless they can establish that it is not "unfairly discriminatory".[107]

Finally, another regulatory option could centre around placing liability requirements on platforms. Companies aggregate and analyse data about people to reveal sensitive data about people's physical and mental health.[108] Such information, which has been referred to as Emergent Medical Data (EMD), enables the profiling of consumers, and then serving them targeted ads for merchandise that include weight loss pills, laxatives and even stimulants—all products that can exacerbate people's conditions and increase their degree of disability.[109] Similarly, as discussed

104 On 25 November 2019, Governor Cuomo signed legislation, S.2302, 2019–2020 Leg. (Ny. 2020), available at https://www.nysenate.gov/legislation/bills/2019/s2302 (visited 14 December 2020). The bill states, *inter alia*: "Section 380-j of the general business law is amended by adding a new subdivision (h) to read as follows: (h) No consumer reporting agency shall collect, evaluate, report, or maintain in the file on a consumer the credit worthiness, credit standing or credit capacity of members of the consumer's social network for purposes of determining the credit worthiness of the consumer; the aver- age credit worthiness, credit standing or credit capacity of members of the consumer's social network; or any group score that is not the consumer's own credit worthiness, credit standing or credit capacity. The provisions of this subdivision shall be enforced concurrently by the superintendent of financial services and the director of the division of consumer protection and each shall utilize their consumer complaint and assistance hotlines to document complaints by consumers who believe that group credit ratings of their social media network are being used to deny them credit".

105 *Ibid*.

106 *Ibid*.

107 New York State Department of Financial Services, "RE: Use of External Consumer Data and Information Sources in Underwriting for Life Insurance" *Insurance Circular Letter No. 1* (January 2019), available at https://www.dfs.ny.gov/industry_guidance/circular_letters/cl2019_01 (visited 14 December 2020).

108 See Marks, "Algorithmic Disability Discrimination" (n. 86) (describing this process as mining for EMD, and explaining how when analysed by machine learning, entities reveal massive amounts of information).

109 *Ibid*.

earlier, disability-related EMD is also used in scoring and ranking people. To prevent entities from discriminating, exploiting and even harming consumers in such ways, one discussed regulatory solution is expanding the definition of the Health Information Portability and Accountability Act's (HIPAA's) covered entities.[110] If the definition covered digital platforms and other entities that mine EMD, it would prohibit them from marketing products to users based on their protected health data. But this solution may not address all the risks posed by EMD-based ranking and disability bias, as some EMD are inferred from digital traces with minimal or untraceable link to any disabilities. Thus, HIPAA's definition of "health information" must be broad enough to encompass inferred health data derived from medical and non-medical sources.

Additionally, another way to help limit algorithmic disability discrimination and data exploitation, without needing to redefine Protected Health Information, which is people's personal health information that gets filled out in any form, including physical records, electronic records or spoken information, is to impose fiduciary duties on entities that collect EMD.[111] Fiduciary duties lower exploitation levels in relationships that are based on asymmetries of knowledge and power–for example, between an expert who is a service provider and a customer–and in which trust is a key component.[112] Large Internet platforms have recently become the subject of a new information fiduciaries theory proposed by Jack Balkin[113] that focuses on the fiduciary duties they owe to their users. The theory is meant to rebalance the relationship between regular individuals and the tech giants that collect, digest and sell their personal information for profit.[114] Balkin argues that just as laws can enforce special duties of care, confidentiality and loyalty on specific service providers such as lawyers or doctors, laws should also create special duties digital platforms to the benefits of their end users.[115]

C. Proprietary claims should not prevent challenging algorithm-driven decisions

An explainable AI represents quite a different challenge than a decision based on ethically and legally correct assumptions. While explainability is a key feature of any decision-making process, in the context of explainable AI, it mainly serves as

110 *Ibid*.
111 *Ibid*. See also Katherine J Strandburg, "Free Fall: The Online Market's Consumer Preference Disconnect" (2013) 2013 *University Chicago Legal Forum* 95, 168.
112 Tamar Frankel, "Fiduciary Law" (1983) 71:3 *California Law Review* 795, 800.
113 See generally Jack M Balkin, "Information Fiduciaries and the First Amendment" (2016) 49:4 *U.C. Davis Law Review* 1183 (explaining how First Amendment considerations affect the rising group of information fiduciaries).
114 *Ibid*., 1227.
115 *Ibid*., 1204–1209.

a helpful debugging tool for detecting biases in models of machine learning.[116] But explaining the functionality of highly complicated algorithmic decision-making systems can be a very technically challenging problem.[117] Indeed, internal processes and systems typically can be represented in ways that people cannot understand and interpret the inner structure and processes.

In recent years, advocates challenging algorithmic decisions have faced unexpected hurdles when biased or discriminatory entities claimed that the digital or algorithmic tools they used cannot be reviewed and are proprietary.[118]

Explainable AI is only useful for solving the problems identified earlier, if the explanations are accessible to the able-bodied and disabled individuals equally. Therefore, digital or algorithmic tools that impact individuals and their lives cannot be kept a secret. However, many digital or algorithmic tools are considered proprietary products, which means that they are used, produced or marketed under exclusive legal right of the inventor or maker, and are protected by secrecy, patent or copyright law. This issue must be addressed. In order for explainable AI to work, proprietary claims should not prevent discriminated or biased against individuals from accessing the information necessary to understand and challenge the decisions made about them.[119]

Conclusion

Technology is necessarily intertwined with the experience of disability, because a society's technology determines which personal attributes are disabling. Advances in digital technology have the potential to both mitigate and perpetuate the aspects of society that disable. Policymakers, and society at large, therefore, must act to prevent the algorithmic discrimination that hurts persons with disabilities. First, lawmakers should continue to promote innovation and inclusion for individuals with disabilities—in all digital, social, professional and financial aspects of life[120]—while constantly exploring existing anti-discrimination laws and regulations to ensure that they do not inadvertently bless discriminatory systems. Second, being innovative and careful is simply not enough—we must ensure that people

116 Lisa Käde and Stephanie von Maltzan, "Towards A Demystification of the Black Box-Explainable Ai and Legal Ramifications" (2019) 23:3 *Journal of Internet Law* 3, 4 (examining explainable AI).

117 Joshua Kroll, Solon Barocas, Edward W Felten, Joel R Reidenberg, David G Robinson and Harlan Yu, "Accountable Algorithms" (2017) 165:3 *University of Pennsylvania Law Review* 633 (discussing how technological tools can enhance algorithmic accountability too, and in certain situations do so better than legal and policy interventions).

118 See Brown *et al*., *CDT Report* (n. 61), p. 18.

119 Hannah Bloch-Wehba "Access to Algorithms" (2020) 88:4 *Fordham Law Review* 1265 (discussing how the law of access performs key functions in promoting algorithmic accountability and transparency and examining it in the context of government proceedings and records, in connection with promoting algorithmic transparency and accountability in public sector decision-making).

120 See generally Ekstrand, "Democratic Governance" (n. 16), 429 (discussing the ADA in the context of digital access and accommodating more in order to increase for digital inclusion and access for individuals with disabilities).

with disabilities are not left out of innovations.[121] Last, lawmakers, with the help and guidance of people with disabilities, should focus on distinguishing between legitimate individuals' assessments and socially harmful ranking, like New York State has done in connection with social credit and insurance decisions based on social media platforms' data.

121 *Ibid*.